

We claim:

1. A process for preparing cyclododecanone by reacting cyclododecene with dinitrogen monoxide.
- 5 2. A process as claimed in claim 1, wherein the dinitrogen monoxide source is at least one dinitrogen monoxide-containing offgas of at least one industrial process.
- 10 3. A process as claimed in claim 2, wherein the dinitrogen monoxide source is the offgas of an adipic acid plant and/or of a dodecanedioic acid plant and/or of a hydroxylamine plant and/or of a nitric acid plant operated with the offgas of an adipic acid plant and/or of a dodecanedioic acid plant and/or of a hydroxylamine plant.
- 15 4. A process as claimed in any of claims 1 to 3, wherein cyclododecene is reacted with a gas mixture containing from 20 to 99.9% by weight of dinitrogen monoxide, based on the total weight of the gas mixture.
- 20 5. A process as claimed in any of claims 1 to 4, wherein dinitrogen monoxide or the gas mixture containing dinitrogen monoxide is used in liquid form.
6. A process as claimed in any of claims 1 to 5, wherein the reaction is carried out continuously in at least one tubular reactor at a temperature in the range from 25 140 to 350°C.
7. A process as claimed in any of claims 1 to 6, wherein a mixture comprising cis-cyclododecene and trans-cyclododecene is reacted with dinitrogen monoxide in two stages.
- 30 8. A process as claimed in claim 7, wherein the reaction in the first stage is carried out at a temperature in the range from 140 to 300°C and the reaction in the second stage at a temperature in the range from 165 to 325°C, the temperature in the first stage being lower than the temperature in the second stage.
- 35 9. A process as claimed in any of claims 1 to 8, wherein the cyclododecene is obtained from the catalytic hydrogenation of at least one cyclododecatriene.
- 40 10. A process as claimed in claim 9, wherein cyclododecatriene is hydrogenated to cyclododecene and cyclododecene is converted to cyclododecanone using dinitrogen monoxide in the presence of the same catalyst.

11. A process as claimed in claim 10, wherein the reactant used for the reaction with dinitrogen monoxide is a mixture which results from the hydrogenation of cyclododecatriene to cyclododecene in the presence of a homogeneous catalyst and comprises cyclododecene and homogeneous catalysts.
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12. A process for preparing cyclododecanone, which comprises steps (I) and (II):
 - (I) preparing cyclododecene by partially hydrogenating cyclododecatriene;
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 - (II) reacting cyclododecene obtained in (I) with dinitrogen monoxide to obtain cyclododecanone.
13. A process as claimed in claim 12, wherein the source used for the dinitrogen monoxide used in (II) is at least one offgas comprising dinitrogen monoxide from at least one industrial process.
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14. A process as claimed in claim 13, wherein the dinitrogen monoxide source is the offgas of an adipic acid plant and/or of a dodecanedioic acid plant and/or of a hydroxylamine plant and/or of a nitric acid plant operated with the offgas of an adipic acid plant and/or of a dodecanedioic acid plant and/or of a hydroxylamine plant.
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15. A process as claimed in any of claims 12 to 14, wherein cyclododecene is reacted in (II) with a gas mixture containing from 20 to 99.9% by weight of dinitrogen monoxide, based on the total weight of the gas mixture.
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16. A process as claimed in any of claims 12 to 15, wherein the dinitrogen monoxide or the gas mixture containing dinitrogen monoxide is used in liquid form.
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17. A process as claimed in any of claims 12 to 16, wherein the reaction is carried out in (II) continuously in at least one tubular reactor at a temperature in the range from 140 to 350°C.
- 35 18. A process as claimed in any of claims 12 to 17, wherein a mixture comprising cis-cyclododecene and trans-cyclododecene is reacted in (II) with dinitrogen monoxide in two stages.
19. A process as claimed in claim 18, wherein the reaction in the first stage is carried out at a temperature in the range from 140 to 300°C and the reaction in the
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second stage at a temperature in the range from 165 to 325°C, the temperature in the first stage being lower than the temperature in the second stage.

20. A process as claimed in any of claims 12 to 19, wherein cyclododecatriene is partially hydrogenated to cyclododecene in (I) and cyclododecene is converted to cyclododecanone using dinitrogen monoxide in (II) in the presence of the same catalyst.
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21. A process as claimed in claim 20, wherein the reactant used for the reaction with dinitrogen monoxide in (II) is a mixture which results from the partial hydrogenation of cyclododecatriene to cyclododecene in the presence of a homogeneous catalyst in (I) and comprises cyclododecene and homogeneous catalyst.
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